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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWNSHIP OF DOWNIE

COUNTY OF PERTH

1965

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TOWNSHIP OF DOWNIE
COUNTY OF PERTH
- 1965

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Report on a water pollution
survey of the township of
Downie, county of Perth.
80743

R E P O R T

on a

WATER POLLUTION SURVEY

of the

TOWNSHIP OF DOWNIE

COUNTY OF PERTH

Sampling Dates: - April 26, 1965
June 24, 1965

Division of Sanitary Engineering

R E P O R T

ONTARIO WATER RESOURCES COMMISSION

A water pollution survey of the Township of Downie was carried out on April 26 and June 24, 1965. The purpose of the survey was to determine the nature and extent of all sources of domestic and industrial pollution within the township as a basis for evaluating water supply and sewage treatment requirements.

I GENERAL

The Township of Downie is situated in the southwest portion of the County of Perth with the City of Stratford on the northeast limits. The township lies completely within the Thames River watershed with surface drainage effected through Black Creek, Otter Creek, Trout Creek and the Avon River, all of which flow in an east to west direction to their confluences with the Thames River. The township is considered to be the finest farming area in the county with predominantly sandy loam soil with good drainage conditions.

The township is largely rural in nature with a population of 2,588 and an assessment of \$3.75 million. The major areas of population density are the hamlets of Avonton, Harmony, St. Paul's Station and Sebringville. Sebringville's residential development has been fairly extensive in recent years due to the close proximity to the City of Stratford and the present population is estimated at 900. It should be noted that the hamlet lies in both the Township of Downie

and the Township of Ellice with each sharing responsibility for approximately one-half of the community.

The township's economy is based largely on agricultural land use and one small milk processing industry.

II WATER USES

1. Municipal Water Supplies

There are no municipal water supply systems in the township.

2. Private Water Supplies

From information obtained during this survey, it would appear that individual wells are in use throughout the township with no more than two or three homes serviced from any single source.

The individual wells in the Sebringville area have an average depth of 150 feet and a static water level of 10-15 feet. The upper 50 feet of bedrock is reported to be a good water-bearing formation which will yield up to 30 gpm on most wells. Excessive concentrations of sulphides are experienced in some areas. Wells in the southern portions of the township are generally much deeper (280 feet average depth) and the static level averages 100-120 feet.

3. Industrial Water Supplies

The Avonbank Cheese and Butter Co-operative requires large volumes of water for process and cooling purposes. The company relies on a deep drilled well which appears to be adequate.

4. Recreational Use

Black Creek, Otter Creek and the Avon River are not used to any extent for recreational purposes such as bathing, swimming or camping. Trout Creek in the extreme southern section of the township affords more suitable conditions for such uses. A dam is currently under construction on the creek just south of Highway 7 as part of the program of the Upper Thames River Conservation Authority. A United Church of Canada summer camp is located several miles further upstream, 1.5 miles southwest of Harmony.

5. Agricultural Uses

The numerous watercourses in the township are used extensively for the watering of farm stock.

III WATER POLLUTION

(a) Existing Conditions

There are no municipal facilities for the collection and treatment of domestic sewage within the township. The disposal of sanitary wastes is left to the individual property owner and in most cases consists of septic tank or cesspool systems. Such installations are not supervised, as there is no organized health unit in the township.

A thorough inspection of conditions throughout the township found no evidence of domestic wastes entering any watercourse except in the hamlet of Sebringville. Additionally, the water pollution control plant serving the City of Stratford is located within the township and

discharges treated effluent to the Avon River. These two locations are considered as sources of pollution and are discussed in detail as follows:

Hamlet of Sebringville

In a survey conducted in 1963, the Commission found that the highway storm sewers in the hamlet and two municipal drains were discharging polluting materials to the creek. The storm sewer system was known to have a number of connections to private cellar drains. Further, a number of private drains which discharged directly to the watercourses were also found to be responsible for pollution.

In the summer of 1964, reconstruction of the highway which serves as the main street, was undertaken by the Ontario Department of Highways. The existing storm sewer system was replaced and the majority of homes fronting the highway were provided with connections of the cellar drains to the new storm sewers. No attempt was made to determine the nature of the waste materials which these drains would convey.

City of Stratford Water Pollution Control Plant

This plant is located just west of the city limits of Stratford on the south bank of the Avon River. Constructed in 1958 by the OWRC, the plant was designed to handle a waste volume of 8 million gallons per day. Records of the 1964 operations at this plant indicate an average daily flow of approximately 3.5 million gallons. Treatment efficiency is reported to be 95 per cent with respect to BOD and

suspended solids and the plant effluent is normally within the Commission's recommended limits in this regard.

The plant is not presently equipped with facilities for chlorination of the effluent. Routine sampling of the Avon River over the past four years has revealed that gross bacterial contamination exists in the river downstream from the plant discharge.

(b) Proposed Sewage Works

There are no plans at the present time for the construction of sewage works at any of the developed areas in the township.

With regard to the Stratford treatment plant, a consulting engineer is preparing plans for the addition of chlorination facilities. It is expected that the facilities should be in operation in 1966 and that the additional treatment should result in a marked improvement in the water quality in the Avon River downstream from the city.

2. Industrial Waste Disposal

Until recently there were two industries in the township, Avonbank Cheese and Butter Company Limited and Black Creek Foods Limited, both of which were engaged in the production of dairy products. On August 28, 1965 Black Creek Foods Limited suspended its operations. OWRC records show that while in operation this plant had been a constant source of pollution of Black Creek. This was mainly due to inadequate waste treatment facilities and lack of maintenance.

Avonbank Cheese and Butter Company Limited is engaged in the

manufacture of cheese and skim milk powders. The average daily intake of raw milk is 60,000 pounds.

The plant's wastewaters are disposed of in the summer season by means of a spray irrigation system situated on the bank of the Avon River opposite the plant. During the winter months, all wastes are discharged to the Avon River. In the period 1961-65 several inspections of the disposal system were carried out by Commission staff. On various occasions, the disposal facilities were operating improperly, resulting in the discharge of polluting material to the river. The reports of these inspections indicate that the design of the system was faulty and that the facilities were poorly maintained.

3. Refuse Disposal

The Township of Downie maintains an open dump site situated at Lot 15, Concession II, 1.25 miles south of Highway 8. The disposal area did not appear to be a source of pollution to the surface or ground waters in the immediate vicinity.

4. Discussion of Sample Analyses

A series of samples was taken from Avon River, Black Creek, St. Paul's Drain and from sewer outlets discharging into the above watercourses. The laboratory results of analyses of these samples are included in tables I and II which are appended to this report. Reference should be made to the appendix for an explanation and the significance of the laboratory analyses.

Insofar as the Township of Downie is concerned, the analyses of the samples reveal considerable pollution of Avon River at the point where it passes the Avonbank Cheese Company Limited processing plant.

Impairment of Black Creek occurs as it passes through the hamlet of Sebringville.

SUMMARY

A water pollution survey of the Township of Downie was carried out on April 26 and June 24, 1965.

The results of this survey indicate that domestic and to a greater degree, industrial wastes, are contributing to the pollution of the Avon River and Black Creek, both of which are tributaries of the Thames River. The severe pollution of the Avon River is the result of raw milk wastes entering this watercourse from the operation of Avonbank Cheese Company. This problem may be overcome by increasing the capacity of the existing spray irrigation system, and providing a more efficient maintenance for same. Since the spray irrigation system can be operated only during the frost-free months, the industry should consider the provision of adequate treatment for the plant wastes on a year-round basis. It is expected that the pollution in Black Creek will be greatly reduced as a result of the suspension of operations at Black Creek Foods.

The pollution of Black Creek by domestic waste in the hamlet of Sebringville can be attributed to some of the highway storm sewer connections and malfunctioning private sewage disposal systems. The

storm sewer connections which are currently conveying domestic or industrial waste from private premises to the highway storm sewers or directly to the river should be severed. If disposal of these wastes cannot be achieved satisfactorily on an individual basis, then consideration should be given to development of a municipal sewage treatment system for the hamlet.

RECOMMENDATIONS

1. The Avonbank Cheese Company Limited should provide effective operation of their existing waste treatment facilities. Also at this time the industry should engage in a study for the possibility of providing treatment for their plant waste on a year-round basis.

2. To abate the existing pollution of the Black Creek by domestic wastes in Sebringville, the municipal authorities should insist that all private sewage disposal systems are functional and in no way connected with the highway storm sewer system.

3. If the disposal of domestic wastes cannot be achieved satisfactorily on an individual basis, then consideration should be given to development of a municipal sewage treatment system for the hamlet.

All of which is respectfully submitted

Acting District Engineer

G. H. Mills
G. H. Mills

Approved by

J. R. Barr, Director

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TABLE I
TOWNSHIP OF DOWNIE

<u>Sample Pt. No.</u>	<u>Location</u>	<u>Date</u>	<u>5-Day BOD (ppm)</u>	<u>Total (ppm)</u>	<u>Susp. (ppm)</u>	<u>Dissolved Oxygen (ppm)</u>	<u>M.F. Coliforms per 100 ml</u>	<u>Estimated Flow</u>
1	Avon River 500 ft. upstream from Stratford WPCP	Apr. 26	2.2	392	72	-	7,500	river high due to spring runoff
		June 24	3.2	386	13	8	610	
2	Avon River 500 ft. downstream from Stratford WPCP	Apr. 26	3.4	434	60		110,000	
		June 24	7.0	760	8	6	18,000	
3	Effluent sewer outlet Stratford WPCP	Apr. 26				outlet submerged		approx. 4 mgd
		June 24	3.4	322	52		139,000	
4	Avon River 500 ft. upstream from Avonbank Cheese Co.	Apr. 26	2.6	400	63		11,700	
		June 24	2.2	672	19	6	880	
5	Avon River 500 ft. downstream from Avonbank Cheese Co.	Apr. 26	7.4	406	65		11,000	
		June 24	355.0	880	111	4	730,000,000	
6	Waste effluent drain Avonbank Cheese Co.	Apr. 26	1550.0	3,254.0	922			approx. 10,000 gpd
		June 24	3100.0	3,272.0	744		2,210,000,000	

TABLE I (CONT'D)

<u>Sample Pt. No.</u>	<u>Location</u>	<u>Date</u>	5-Day BOD (ppm)	<u>Solids</u>		<u>Dissolved Oxygen</u> (ppm)	<u>M.F. Coliforms per 100 ml</u>	<u>Estimated Flow</u>
				<u>Total</u> (ppm)	<u>Susp.</u> (ppm)			
7	Storm sewer- Avonton	Apr. 26	2.1	368	17		22,500	
		June 24			Dry			
8	Avon River 1 mile southwest of Stratford	Apr. 26	3.0	408	69	-	30,000	river high due to spring runoff
		June 24	-	-	-	-		
9	Municipal drain at St. Paul's Station	Apr. 26	1.6	354	5		27,000	
		June 24	2.8	288	16		380	

TABLE II

TOWNSHIP OF DOWNIE

Sample Pt. No.	Location	Date	5-Day BOD (ppm)	Solids		Dissolved Oxygen (ppm)	M.F. Coliforms per 100 ml	Estimated Flow
				Total (ppm)	Susp. (ppm)			
1	Black Creek ½ mile upstream from Sebringville	Apr. 26	2.2	342	26		380	high flow due to spring runoff *approx. 1 mgd
		June 24*	1.5	362	6	5	540	
2	Black Creek at highway bridge at Sebringville	Apr. 26	2.2	330	29	-	1,290	
		June 24	3.0	364	13	3	163,000	
3	Black Creek ¼ mile upstream from Black Creek Foods Ltd.	Apr. 26	1.9	316	8	-	1,400	
		June 24	2.5	280	11	6	190	
4	Black Creek ¼ mile downstream from Black Creek Foods Ltd.	Apr. 26	1.2	356	32	-	4,700	
		June 24	75.0	414	26	5	730,000	
5	Open drain in front of Lucky's Hotel - Sebringville	Apr. 26	2.5	280	11		60,000	
		June 24	7.2	1932	27		205,000	

APPENDIX

EXPLANATION AND SIGNIFICANCE OF LABORATORY ANALYSES

ALL THE LABORATORY TESTS INCLUDED IN THIS REPORT WERE PERFORMED AT THE ONTARIO WATER RESOURCES COMMISSION LABORATORY IN TORONTO.

A. BACTERIOLOGICAL EXAMINATION

THE MEMBRANE FILTER TECHNIQUE IS USED TO OBTAIN A DIRECT ENUMERATION OF COLIFORM ORGANISMS. THESE ORGANISMS ARE NORMAL INHABITANTS OF THE INTESTINES OF MAN AND OTHER WARM-BLOODED ANIMALS. THEY ARE ALWAYS PRESENT IN LARGE NUMBERS IN SEWAGE AND ARE GENERALLY MINIMAL IN OTHER WATER POLLUTANTS.

THE RESULTS OF THE EXAMINATIONS ARE REPORTED AS "M.F. COLIFORM COUNT PER 100 ML".

THE COMMISSION'S OBJECTIVE FOR STREAM SANITATION IS A COLIFORM DENSITY OF NOT GREATER THAN 2,400 ORGANISMS PER 100 ML.

B. SANITARY CHEMICAL ANALYSES

BIOCHEMICAL OXYGEN DEMAND (BOD):

BIOCHEMICAL OXYGEN DEMAND IS REPORTED IN PARTS PER MILLION (PPM), AND IS AN INDICATION OF THE AMOUNT OF OXYGEN REQUIRED FOR THE STABILIZATION OF DECOMPOSABLE ORGANIC MATTER IN THE WATER. THE COMPLETION OF THE LABORATORY TEST REQUIRES FIVE DAYS, UNDER THE CONTROLLED INCUBATION TEMPERATURE OF 20°C.

THE COMMISSION OBJECTIVE FOR STREAM WATER QUALITY IS AN UPPER LIMIT OF 4 PPM.

SOLIDS:

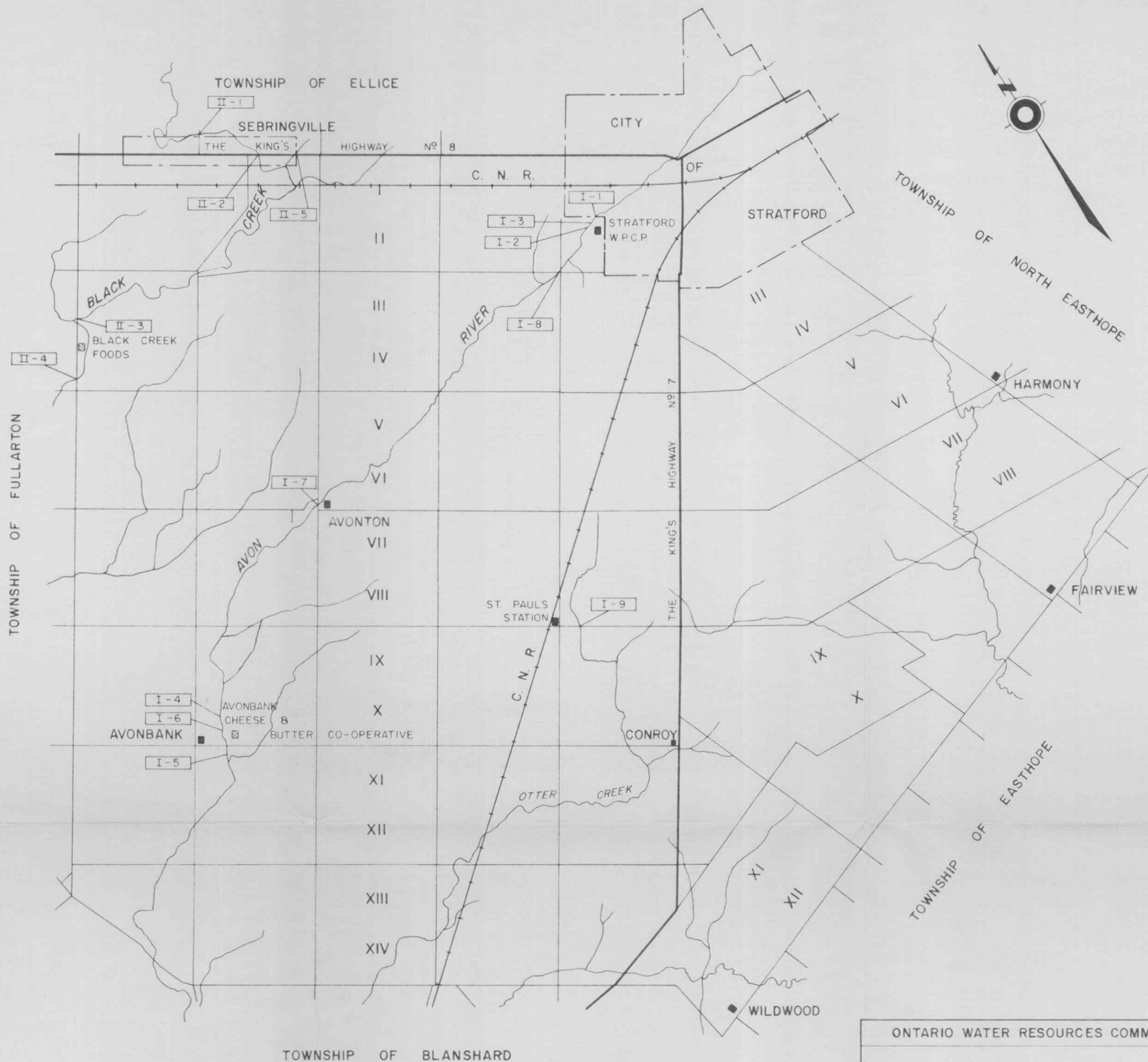
THE VALUE FOR TOTAL SOLIDS, EXPRESSED IN PARTS PER MILLION (PPM), IS THE SUM OF THE VALUES FOR THE SUSPENDED AND THE DISSOLVED MATTER IN THE WATER. THE CONCENTRATION OF SUSPENDED SOLIDS IS GENERALLY THE MOST SIGNIFICANT OF THE SOLIDS ANALYSES IN REGARD TO STREAM WATER QUALITY.

THE EFFECTS OF SUSPENDED SOLIDS IN WATER ARE REFLECTED IN DIFFICULTIES ASSOCIATED WITH WATER PURIFICATION, DEPOSITIONS IN STREAMS, AND INJURY TO THE HABITAT OF FISH.

WHERE SUSPENDED SOLIDS VALUES ARE LESS THAN 20 PPM LABORATORY DIFFICULTIES ARE EXPERIENCED AND THE TURBIDITY IS DETERMINED INSTEAD.

TURBIDITY:

TURBIDITY IS CAUSED BY THE PRESENCE OF SUSPENDED MATTER, SUCH AS CLAY, SILT, FINELY DIVIDED ORGANIC MATTER, PLANKTON AND OTHER MICROSCOPIC ORGANISMS IN WATER. IT IS AN EXPRESSION OF THE OPTICAL PROPERTY OF A SAMPLE AND RESULTS ARE REPORTED IN "SILICA UNITS".



LEGEND

- I-4 - AVON AND OTTER CREEK SAMPLING POINTS (TABLE I)
- II-4 - BLACK CREEK SAMPLING POINTS (TABLE II)

ONTARIO WATER RESOURCES COMMISSION

TOWNSHIP OF DOWNIE WATER POLLUTION SURVEY

SCALE: 0 1 2 MILES

DRAWN BY: W.R.E. DATE: NOVEMBER 1965

CHECKED BY: DRAWING No: 65-150